Installation Guide
Controller Series E130/E230/E430

Products
E130-DP
E230-DP
E430-DP

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Important notes for E130/E230/E430 series controllers

CAUTION !!

In order to assure a safe and error free operation, and to avoid severe damage to system components, all system components must be directly attached to a single ground bus that is earth or utility grounded.

Each system component should be tied directly to the ground bus (star pattern), rather than daisy chaining from component to component. (LinMot motors are properly grounded through their power cables when connected to LinMot controllers.)

All connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot controller LED's have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage been disconnected). Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.

Do not switch Power Supply DC Voltage. All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply.

Do not connect or disconnect the motors from controllers with voltage present. Wait to connect or disconnect motors until all LinMot controller LED's have turned off. (Capacitors may not fully discharge for several minutes after power has been turned off). Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.

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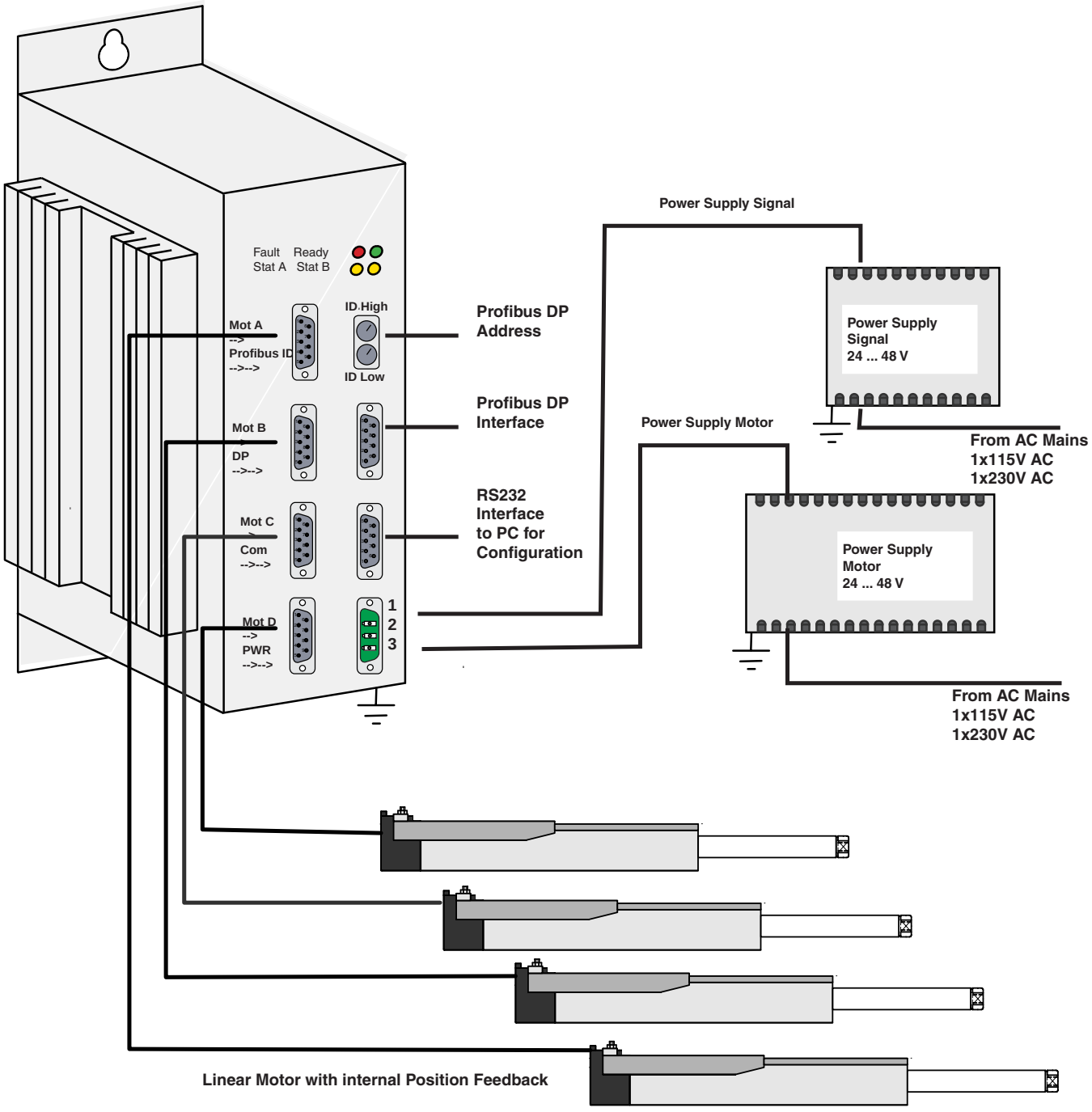
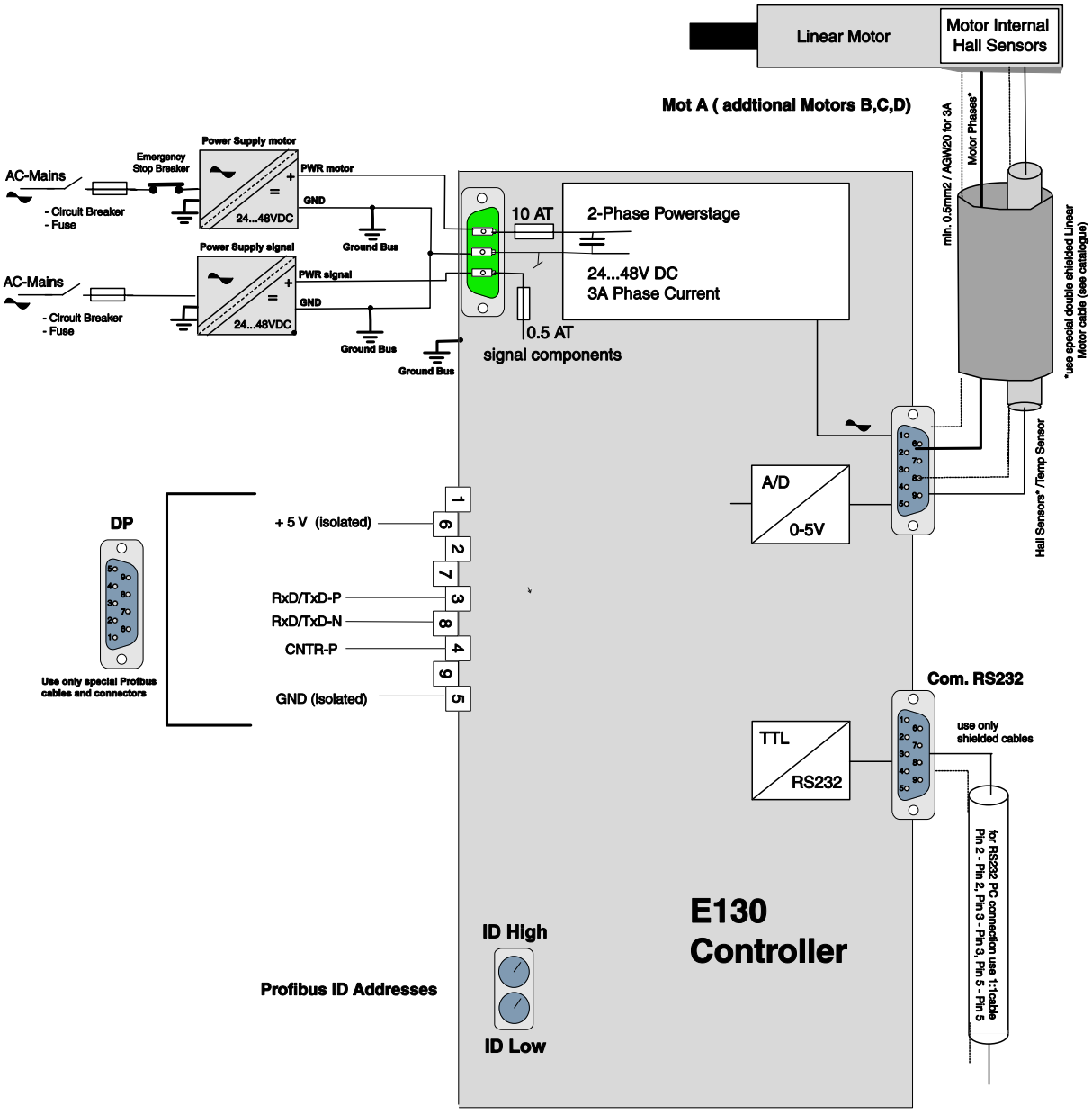
Note
The information in this documentation reflects the stage of development at the time of press and is therefore without obligation. NTI AG. reserves itself the right to make changes at any time and without notice to reflect further technical advance or product improvement.

System Overview



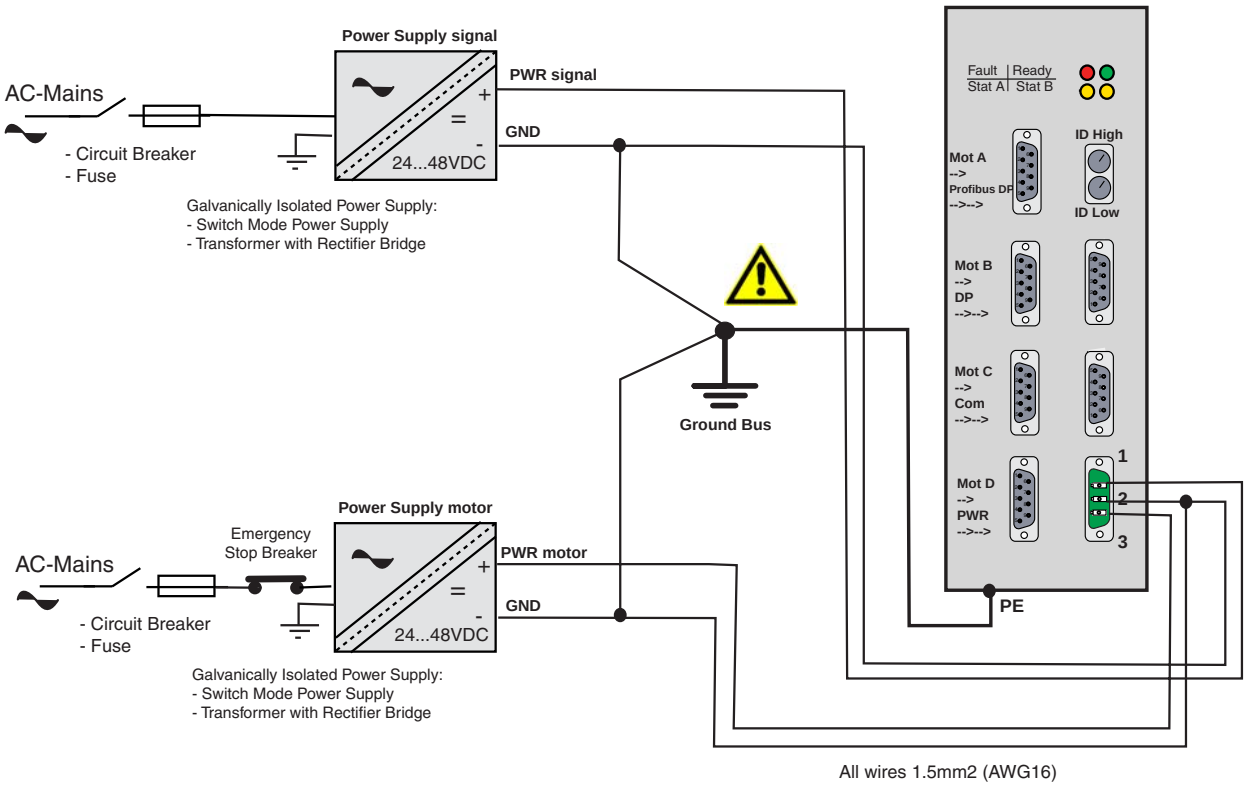
Complete E430 Controller based system (E130 and E230 controllers will only drive one respectively two motors). Power Supply for Signal and Motor may be the same device (see later).

E130 series Function and Wiring



Picture shows typical wiring of a single axes controller. Multiple axes controller will have additional motor connectors.

Power Supply and Grounding



Instead of two separated power supplies it may be possible to use only one power supply if there is no need to control the signal power supply (logical devices of the controller) and the power supply of the powerstage for the motors independently (see safety rules of the application).

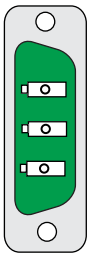
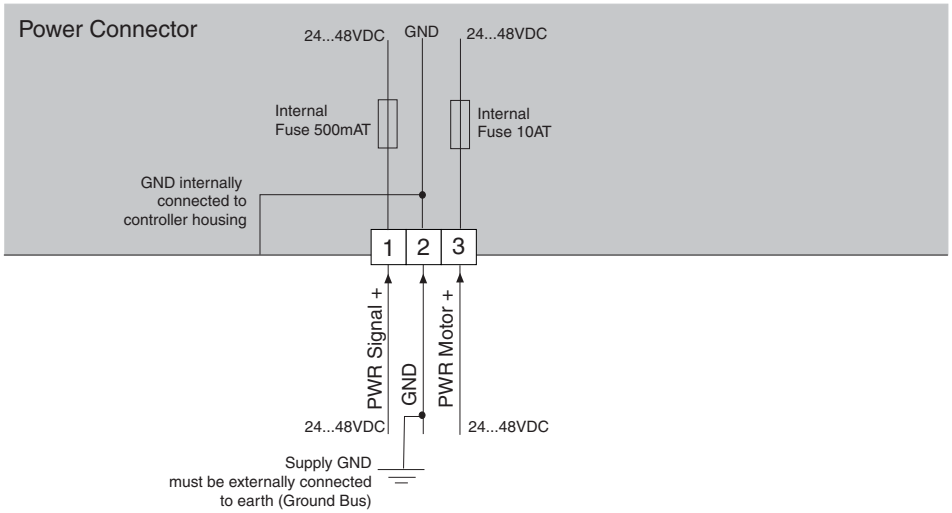
In order to assure a safe and error free operation, and to avoid severe damage to system components, **all system components must be well grounded to either a single earth or utility ground.** This includes both LinMot and all other control system components to the same ground bus.

Each system component should be tied directly to the ground bus **(star pattern**), rather than daisy chaining from component to component. (LinMot motors are properly grounded through their power cables when connected to LinMot controllers.)

Power supply connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot controller LED's have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage been disconnected).Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.

Do not switch Power Supply DC Voltage. All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply. Failure to observe these precautions may result in severe damage to controller.

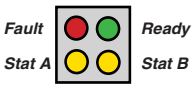
Description of the connectors / Interfaces

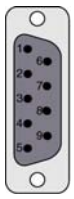
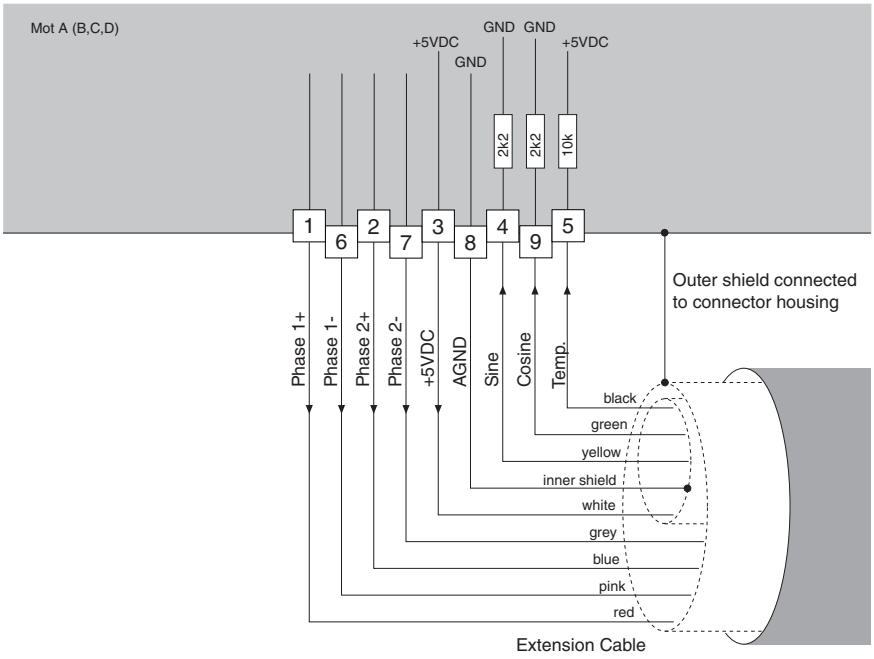
	Power Supply
 1 PWR Signal+ 2 GND 3 PWR Motor+	

Supply:
Supply Voltage 24...48VDC. Absolute max. Rating 48VDC + 10%
Supply voltage for PWR Signal and PWR Motor may be different
Motor Supply GND must be externally connected to earth

Caution:
By exceeding 53VDC supply voltage, the controller will go into error state. Voltage higher than 55 VDC will damage the controller!
Do not switch Power Supply DC Voltage. All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supplies
Power supply connectors must not be connected or disconnected while DC voltage is present.

Wiring:
1.5 mm² (AWG16), max length 5 m

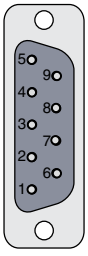
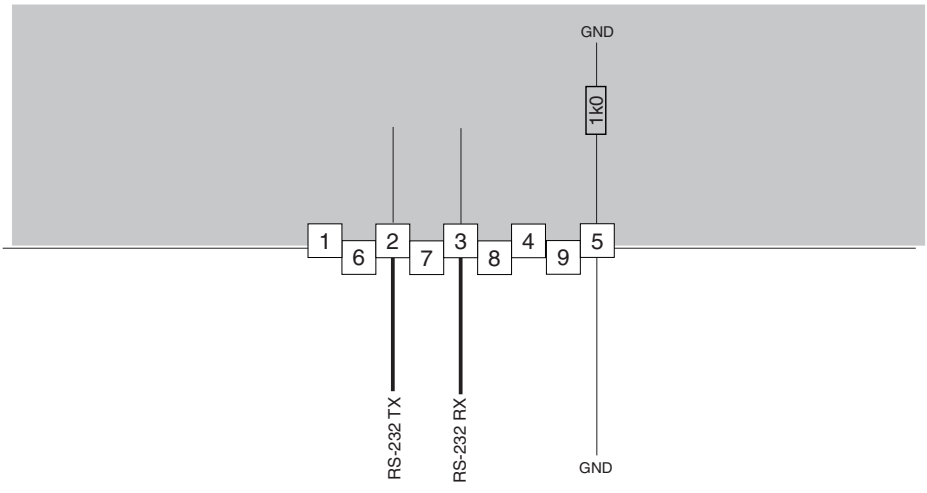
LED	State Display
	Ready Green READY The system has started correctly Stat A Yellow STAT A Coding for the actual operating state Stat B Yelllow STAT B Coding for the actual operating state The display of the various operating states is shown on the last page of this manual. FAULT An error has occurred Fault red (In the state ERROR a blink code of the STAT LEDs A and B tells what the actual error is. The blink codes are explained in chapter 'Service'of the user Manual.)

Mot A (B,C,D)	Motor Connector
 DSUB-9 (female)	

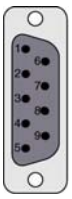
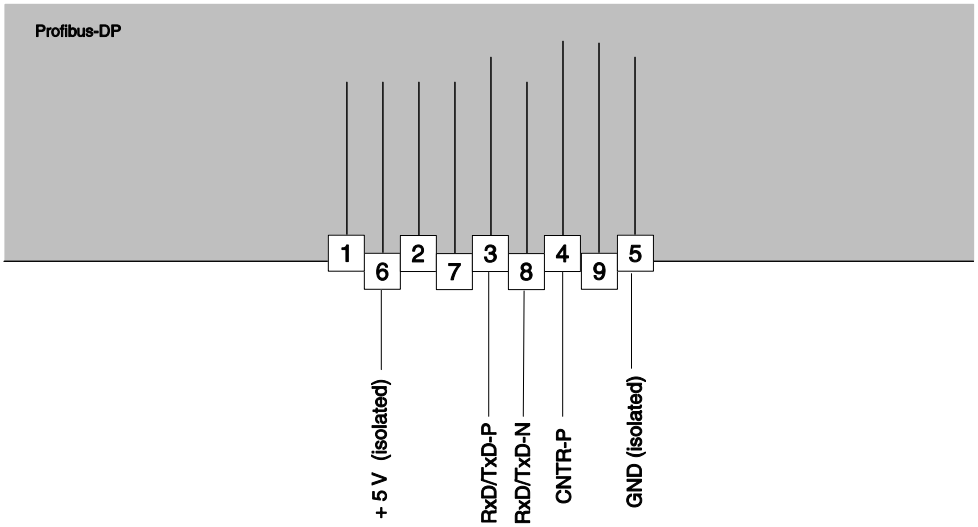
Note:
- Use only special double-shielded Linear Motor Cable (see datasheet 'extension cables')
- Use +5V (Pin 3) and AGND (Pin 8) only for motor internal Hall Sensor supply (max. 100mA).
- Do NOT connect AGND (Pin 8) to ground or earth!
- Inner shield (AGND) and outer shield (earth) must be isolated to each other.

Caution:
- Wrong Motor wiring may damage Linear Motors and/or Servo Controller.
- If you are assembling motor cables by your own, double check motor wiring carefully before power up.

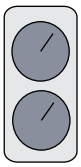
Do not connect or disconnect the motors from controllers with voltage present. Wait to connect or disconnect motors until all LinMot controller LED's have turned off. (Capacitors may not fully discharge for several minutes after power has been turned off).Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.

Com	COM (RS-232)
 DSUB-9 (male)	

RS232: 9.6kBaud, use 1:1 connection cable to PC

DP	Profibus Connector
 DSUB-9 (female)	

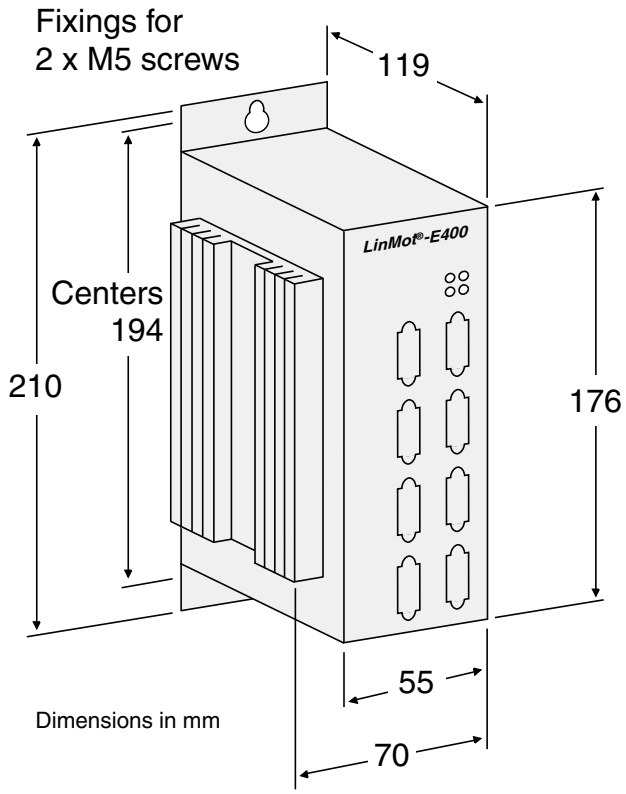
Isolated 5V output: max 50 mA

Profibus ID	
ID High  ID Low	

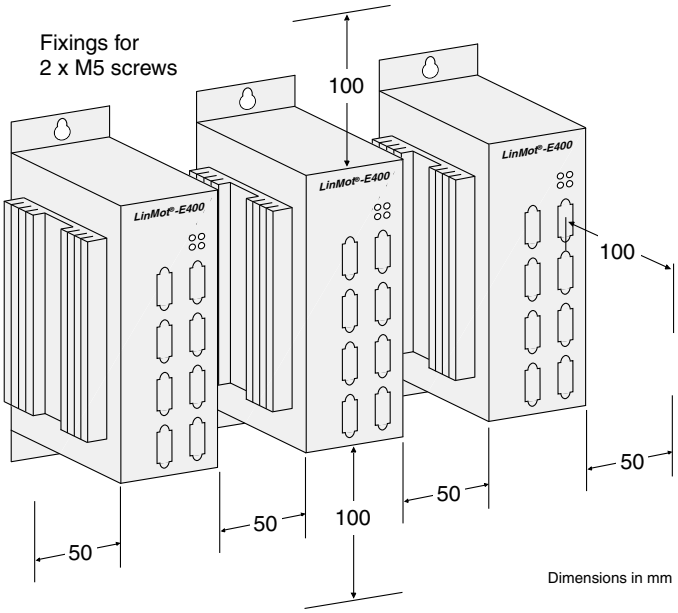
ID 1 : Profibus address high
ID 2 : Profibus address low

Mechanical Dimension

Dimensions



Recommended mounting for multiple controller installation



		E130 *Single axes controller*	***E230*** *2 axes controller*	***E430*** *4 axes controller*
Width	mm (in)	70 (2.8)		
Height	mm (in)	210 (8.3)		
Height without fixings	mm (in)	176 (6.9)		
Depth	mm (in)	119 (4.7)		
Weight	Kg (lb)	1.1 (2.4)	1.2 (2.7)	1.3 (2.9)
Case	IP	40		
Storage Temperature	°C	-25…70		
Operating Temperature	°C	0…50		
Max. Case Temperature	°C	65		

Power Supply Requirement

Power Supply motor

The calculation of the needed power for the Motor supply is depending on the application and the used motor(s). The following table shows a recommendation for general applications.

Controller		Voltage/ Power	LinMot Switched- Power Supply	Part-Nr.
E100	1 motor	48 V / 150 W	S01-48/150	0150-1940
E200	Up to 2 motors	48 V / 300 W	S01-48/300	0150-1941
E400	Up to 4 motors	48 V / 300 W	S01-48/300	0150-1941

Power Supply signal

24 … 48 V / 5 W

Regeneration of Power

The Exxx controller don't use a regeneration resistor. In most application the recuperated energy will not become an issue. In cases where the motor power supply voltage will exceeds the voltage limits because of recuperation an additional capacitor between 'PWR motor' and 'GND' should be used. Typical: 22'000 uF.

Ordering Information

Servo Controller	Description	Art. No.
E130-DP	Profibus Controller 1 Axis (48V/3A)	0150-1621
E230-DP	Profibus Controller 2 Axis (48V/3A)	0150-1622
E430-DP	Profibus Controller 4 Axis (48V/3A)	0150-1624

Declaration of Conformity CE-Marking

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Products: *LinMot* ® Controllers

Type	Art.-No.	Type	Art-No.	Type	Art.-No.
E130-DP	0150-1621				
E230-DP	0150-1622				
E430-DP	0150-1624				

The product must be mounted and used in strict accordance with the installation instruction contained within the User's Manual, a copy of which may be obtained from NTI Ltd.

I declare that as the authorized representative, the above information in relation to the supply/manufacture of this product is in conformity with the stated standards and other related documents in compliance with the protection requirements of the Electromagnetic Compatibility (EMC) Directive 2004/108/EC.

Standards Complied with:

EMI	EN 55011	Class A
EN 61000-6-4		
Electromagnetic	EN 61000-4-2	4 kV / 8kV
Suspectibility EMC	EN 61000-4-4	1 kV / 2kV
EN 61000-6-2	EN 61000-4-3	10 V/m
	EN 61000-4-6	10 V
	ENV 50204	10 V/m

Company
NTI Ltd.

Spreitenbach, July 28, 2010

R. Rohner / CEO NTI AG

Error codes

Error display When an error occurs it is displayed by means of the blinking of at least one of the four LEDs on the front of the servo controller.
Ready LED The Ready LED is ON as soon as the supply voltage for the processor is guaranteed and the system has started up correctly. Communication with the PC over the serial interface is only possible when this LED is ON.
The following table summarizes the blink codes and their meaning:

LED			Description
Fault	**Stat A**	**Stat B**	
● ~ 3Hz	**off**	**off**	HW system error: Hardware error in the servo controller.
2x ● ~ 1Hz			SW1 System error: Software error in the servo controller. The system software wasn't loaded successfully.
● ~ 1Hz			SW2 System error: Software error in the servo controller. The system software wasn't loaded successfully.
On	**● ~ 2Hz**	**● ~ 2Hz**	Generic fault: The exact error message may be displayed with the error inspector.
On	**■**	**2x ●**	The supply voltage for the Power circuitry is too low.
		3x ●	The supply voltage for the Power circuitry is too high.
		4x ●	The supply voltage for the Signal circuitry is too low.
		5x ●	The supply voltage for the Signal circuitry is too high.
		6x ●	The servo controller is too hot.
		8x ●	Application Software Error (see manual)
	1x ●: Mot A **2x ●: Mot B** **3x ●: Mot C** **4x ●: Mot D**	**1x ●**	The motor is overloaded.
		2x ●	The motor is too hot.
		3x ●	Following error.
		4x ●	The slider is missing from the motor.
		6x ●	The initialization was not completed successfully.
		7x ●	Incorrect motor type configured or damaged motor.
		8x ●	A referenced motion profile for a motor is missing. Selected motion profile not valid for actual drive type.

on LED is ON ● LED blinks shortly (ca. ¼s)
off LED is OFF ■ LED blinks longer (ca. 1½s)

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